

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT : LODGE ET AL.
SERIAL NO. : 10/078,024
FILED : FEBRUARY 15, 2002
TITLE : DECORATION METHOD USING THERMOCHROMIC INK
EXAMINER : CROCKFORD
GROUP ART UNIT : 1762

DECLARATION UNDER C.F.R. 1.132

Honorable Commissioner for Patents
and Trademarks
Washington, D.C. 20231

I, ALAN REGINALD JONES, a British subject of 112 Dovehouse Close, Eynsham, Witney,
Oxon, OX29 4EY, declare:-

1. I am a Technical Sales Executive for Neogene Paints, Neogene Works, 14 Caxton Way, Watford Business Park, Watford, WK18 8UI, a position I have held for the last two years. Prior to that I held the position of Technical Sales Director at Pearl Paints Ltd.
2. I have worked in the paint and coatings industry in a technical capacity for over 20 years and, as well as the jobs listed above, I have held a number of positions with Berger Paints Ltd, Glixstone Ltd and Carrs Paints Ltd. I have previously been a member of the Oil and Colour Chemists Association (OCCA) and I am currently a member of the British Society for Coatings Technology (BSCT). During my time in the industry I have worked extensively with thermochromic pigments in a variety of formulations, including thermochromic inks and paints. I am familiar with the Matsui range of thermochromic

products and have had personal experience of these products since 1996. I make this declaration from my own personal knowledge.

3. I have been provided with a copy of US Application Serial No. 10/078,024. I have been asked to provide evidence on the difference between thermochromic inks and thermochromic paints, based on my extensive experience in this field. Thermochromic inks, as supplied for example by Matsui International Company, Inc, have a different chemical formulation, and are intended for a different purpose, to thermochromic paints supplied by the same manufacturer. Although both thermochromic inks and paints may contain the same colour change pigments the fluid base in which the pigments are suspended are different in paints and inks.
4. Firstly, I would like to make it clear that we are dealing here with thermochromic inks and paints. These are significantly different to normal inks and paints because the thermochromic pigments used are much less stable than conventional pigments and have to be encapsulated in a resin to provide useable formulations.
5. There are several key differences that distinguish inks and paints as well as their different formulations. These include different methods of application and different end results obtained following their application.
6. For example, inks are generally applied to part of a substrate surface by a 'printing' process. Such processes include pad printing, ink jet printing, lithography or screen-printing. Such printing processes are generally reserved for the application of inks and not paints.
7. Paints, on the other hand, are generally applied to the whole of a surface to be decorated and are applied using quite different processes to those used to apply inks.

Brushing, spraying, and in particular electrostatic spraying, are processes that are generally reserved for applying paint. Thermochromic ink as supplied by Matsui was never designed for electrostatic spraying.

8. In this context I must stress that thermochromic paints and inks are not the same as everyday inks and paints and it is important to make this distinction. Thermochromic pigments are manufactured in an aqueous medium and resin encapsulated whilst still associated with water. Thus, the first usable product obtained in the manufacturing process is an aqueous slurry of colour change dye or pigment that has been encapsulated in a resin. These slurries can be in the form of stable emulsions. As a consequence these slurries tend to be the least expensive formulation of a thermochrome that is commercially available.
9. These basic slurries may then be processed to give different formulations, often by displacing water with organic solvents or oil-based components to give thermochromic paints and the like. As a consequence, thermochromic paints are significantly more expensive per unit of thermochromic pigment, than the basic ink slurries.
10. James Lodge would therefore have been faced with the dilemma that whilst an ink slurry might provide a cost-effective material it would not and could not adhere successfully to a glazed ceramic surface. On the other hand, whilst thermochromic paint might adhere to a glazed ceramic item it would not give the required intensity of colour unless applied thickly or in successive layers. In either case the cost becomes prohibitive for use on promotional items, which are normally given away free by definition. And the quality of the finish would be unacceptable to the customer. A painted mug, for example, would look just like what it was; a painted mug.

11. I have investigated the use of various different thermochromic inks in the process in question. I have attempted to work the process as set out in US Application Serial No 10/078,024 using a solvent-based thermochromic ink instead of a water-based or aqueous thermochromic ink. I have made many attempts to do this and the most presentable finish I could achieve is shown in Exhibit ARJ1. It will be seen from this that the smoothness of finish is nowhere near as good as that of a WOWMUG using an aqueous thermochromic ink. A so-called orange peel effect over the majority of the mug's outer surface is very evident. Such an effect would NOT be acceptable either to the purchaser of such an item or to the intended recipient. The product from such a process is, in effect, worthless and has no resale value.
12. There is a further important point that I must make about these experiments. My attempts to use a solvent-based thermochromic ink were made using hand spraying equipment. This generally gives a far better finish than can be achieved using a robotic spray line. This is because of the fine control that can be obtained by hand spraying. But hand spraying is time-consuming and labour-intensive and is not an option if there are thousands or tens of thousands of mugs to be sprayed. Thus I would expect that the finish obtained on mass produced mugs sprayed with a solvent-based thermochromic ink on a robotic spraying line would be even less visually appealing than the example in Exhibit ARJ1.
13. I have carried out further experiments with the process described in 10/078,024. I have used a range of thermochromic inks supplied by Matsui Inc. and by Thermographic Measurements Co. Ltd. (TMC), based in the United Kingdom. The results were visually identical and I would therefore expect the process to work with most, if not all, water-based thermochromic inks that are commercially available.

14. I have been asked to advise on how the process of screen-printing might be used to create a WOWMUG. It would, in theory, be possible to screen print over the majority of the cylindrical outer surface of a straight-sided mug. However, there would be regions of the mug where it would be impossible to screen print an image. These include the underside or inside of the handle and where the handle joins the mug body. That is on the surface which the fingers rest on when a mug is picked up using the handle and the area surrounding each end of the handle. The result would be a patchy and incomplete coverage which would, in my opinion, be most unappealing.
15. These problems would be compounded if the mug did not have straight sides or had any degree of ornamentation to it, say for example around the base.
16. I can therefore confirm that a colour change mug with the coverage and appearance of a WOWMUG could not be created using a screen-printing process.

The undersigned, declares further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date: 25th March, 2003 Signed: CR Jan